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ABSTRACT

A study investigated Japanese children's acquisition of the syntactical subcategorization of action verbs. Aspects of caregiver language that provide children with information about the characteristics of an action verb are detailed, and the utterances of four Japanese toddlers are analyzed for their usage characteristics. Caregiver sentences are examined for evidence of how the use of action verbs in specialized contexts predicts syntactic classification of the verb. Developmental predictions for children's use of action verbs are tested, and it is concluded that the evidence supports this account of their acquisition. (MSE)

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Encounters with Japanese Verbs: Categorization into Transitive and Intransitive Classes

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This paper deals with the acquisition of the syntactic subcategorization of action verbs. By action verbs, I mean verbs that refer to physical transformations of the state or location of an entity. Rather than attempt a broad discussion of the issue, I will concentrate on a particular case, the implications of which are extensive. The particular case is the acquisition of action verbs in Japanese. A and B are examples of fully explicit, and quite atypical action sentences in Japanese

(A) *kodomo ga kugi o ana no naka ni ire-ta*
child NOM nail ACC hole's inside LOC put-PAST
Child put nail inside hole.

(B) *kugi ga ana no naka ni hait-ta*
nail SUBJ hole's inside LOC go-PAST
Nail went inside hole.

Japanese is a nominative-accusative language. In transitive action sentences, semantic causers take nominative case, while semantic figures and patients take accusative case. In intransitive action sentences the semantic figures and patients have nominative case. In active sentences, nominative case is marked by the postposition *ga*, and accusative case is marked by the postposition *o*. Unlike English which has verb pairs such as *open* transitive and intransitive, in Japanese a transitive verb cannot have an homophonous intransitive counterpart. What makes Japanese interesting is that the average caregiver sentence underdetermines the syntactic classification of its verb. Sentences A' and B' are far more typical of Japanese caregiver sentences.

(A') *ire-te*
put-REQUEST
(Please) put in (nail inside hole).

(B') *hait-ta*
go in-PAST
(Nail) went in (inside hole).

Despite this indeterminacy the Japanese child comes to know that intransitive action verbs like *hair-* "go in" cannot take a causer argument, and that their figure arguments are marked by *ga*. Conversely, the child comes to know that transitive action verbs like *ire-* "put in" can take a causer argument and that their figure arguments are marked by *o*. Accounts of how the child specifies these characteristics of an action verb are not well detailed. Pinker (1984) proposed Direct Learning from Positive Evidence, a mechanism by which the child hears a verb in a sentence with its array of NP arguments, and constructs a phrase structure tree for the sentence from already

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acquired phrase structure rules" (p. 295). Pinker saw a problem with Direct Learning: it works with preexisting phrase structure trees. The child must first discover legitimate instances of subjects and objects in the target language before Direct Learning may start. This is why Pinker proposed that the first lexical entries are filled out by Canonical Mapping, which induces syntactic subcategorization directly from thematic roles. However, to make canonical mapping work, Pinker (1984) stated that the child must "recover thematic roles inherent in the described action" (p. 297). The problem with this hypothesis is that actions do not come labeled "transitive" or "intransitive" in the environment. The child may recover an agent from the context when a verb is intransitive. This point led Borer and Wexler (1987) to posit the Thematic Inference Principle, which states that, "when a learner is computing thematic roles from situations, s/he assumes a thematic role only if it can be related to an appropriate phrase in the sentence" (p. 135). Thus, when the child hears an intransitive sentence, the child will not associate a causer role with the verb.

These accounts are challenged by the facts of caregiver speech in Japanese. The two-year-old Japanese child seldom hears an input action sentence with the full complement of noun phrases needed to specify the correct number and type of thematic roles for a verb. When NPs are explicit in a sentence, they are seldom accompanied by case marking. To illustrate this point, 300 action sentences were analyzed to estimate the availability of explicit causer, figure and patient NPs, and the availability of case marking for nominative and accusative case (Table 1). Two hundred and fifty of the sentences come from my observations of three boys, H (22-24 months), J (22-24 months), and T, J's elder brother (28-30 months). The observations were done in the home, when the children were playing or snacking. Fifty sentences were taken from the transcripts of H's father and mother, J's father and mother and T's babysitter. In addition, 50 more sentences were taken from the published transcripts of a Japanese mother interacting with her son, Taachan, on his second birthday (Okubo 1981, p. 1-6). The observations of Taachan and mother were made in contexts similar to my own observations.

The sentences were coded for: 1) Explicit causer, figure or patient NPs, and 2) the case marking of these explicit NPs (Table 1). Pooled results are reported as the individuals all showed the same basic pattern of results. The most common type of intransitive sentence did not have an explicit figure or patient argument (Table 1). The most common type of transitive sentence did not have an explicit causer argument. There were no transitive sentences with case marking on both the causer and figure or patient argument. Generally, when arguments were explicit, they lacked case marking, making it impossible to specify the syntactic relations in a great majority of sentences. The tremendous rate of ellipsis and infrequency of case marking in these caregiver sentences call into question the efficacy of Direct Learning from Positive Evidence (Pinker 1984). The the effectiveness of the Thematic Inference Principle (Borer & Wexler 1987) is also doubtful. There are so many missing causer NPs, that a child could end up assigning transitive verbs to the intransitive class. Both of these mechanisms falter because of their dependence upon the correct number and type of explicit NPs. Presently, I will outline an alternative account that avoids this dependence.

Recall that Pinker's (1984) position assumes that the child knows a great deal about intentionality, causality, figure-ground relations, and changes of state.

Assuming the same things, an account can be drawn of the acquisition of the transitive and intransitive action verb classes without reference to explicit NPs. This account makes use of semantic causal types such as those discussed by Talmy (1976). Semantic causal types are integrated into the Aktionsart typology used in Role and Reference Grammar (Foley & Van Valin 1984).

By their second birthday children identify the figure or patient of an action nonlinguistically, and they differentiate between entities with intentions and objects without intentions (Golinkoff, Harding, Carlson, & Sexton, 1982). These two sets of distinctions, the perceptual and psychological are orthogonal. Their intersection define of three semantic causal types: self-agentive, causal agentive and non-agentive. The semantic causal types have specialized contexts of use (Figure 1). The self-agentive type is used when the intention to act is attributed to the figure or patient. In order to know that a verb has a self-agentive use, the child must have evidence that such is the case. There must be an animate figure or patient in the context. Additional evidence is the presence of a verb inflection or auxiliary, such as an imperative or desiderative, that implies the intentional origin of an action. Research on the acquisition of morphology in Japanese, indicates that the two-year-old Japanese child understands at least some of these morphemes (Okubo 1967, Clancy 1986, Rispoli 1988). In contrast, to establish that a verb can be used as a causal-agentive, the attribution of intention to the figure or patient must be blocked, as for example when the figure or patient is inanimate. If the child finds a morpheme that implies intention in a sentence with an inanimate figure or patient in the context, the child deduces that there is an intentional causer participant relevant to the meaning of the verb. This deduction occurs without regard to the lexical instantiation of an agent NP. Finally, without evidence from morphology that a verb can express an agentive type, a verb is taken to express the non-agentive type.

Next I would like to illustrate how the use of an action verb in specialized contexts predicts its syntactic classification. The sample of 300 caregiver sentences was coded for 1) figure or patient referent animacy (including implicit figures and patients) and 2) the presence of a verb suffix or auxiliary that implied the intentional origin of an action. Animacy had three levels, 1) true animate beings, 2) animate surrogates (dolls and pictures of animates) and 3) inanimate objects. The suffixes and auxiliaries implying the intentional origin of an action were: *verb+te* "request", *verb+tai* "desiderative", *verb+(y)o* "hortatory", *verb+cha dame* "prohibitional", *verb+te ii* "permissive", *verb+te kure-* and *verb+te age-* "benefactive" (Soga 1983, p. 87-98). The observed contexts for individual verbs were fitted to the array of specialized contexts for each of the three semantic causal types.

Let us take the fitting of the verbs *suwar-* "sit" (intransitive), *ire-* "put in" (transitive) *hair-* "go in" (intransitive) as examples (Figure 2). There were eight examples of the verb *suwar-*, and four of these examples had morphemes that imply intention, in combination with animate figure referents. Since *suwar-* appeared in the expected context for a self-agentive type, and not in the expected context for a causal-agentive type, the verb *suwar-* was matched to the self-agentive type. There were seven examples of the verb *ire-* "put in". Two of the sentences with *ire-* had morphemes that imply intention. All of the sentences with *ire-* had inanimate figure referents. Since *ire-* appeared in causal-agentive context, and did not appear in the context for the self-agentive type, the verb *ire-* was matched to the causal-agentive type. There were

11 examples the verb *hair-*, but none had morphemes that imply intentional action. Therefore, the verb *hair-* was matched to the non-agentive type.

Fourteen other action verbs were fitted in the same manner (Table 2). Only verbs that occurred five times or more were fitted, to reduce the effects of sampling error. All of the transitive verbs were matched to the causal-agentive type. All of the intransitive verbs were matched to either the self-agentive type or to the non-agentive type. In fact, in the larger sample of 300 sentences, none of the intransitive sentences appeared in the causal-agentive context, and none of the transitive sentences appeared in the self-agentive context. These results show that there is information in the input, not contained in either case marking or explicit NPs, that can allow a semantic grouping of action verbs predicting later syntactic classification.

This approach steers a course through two extreme theoretical positions. One extreme holds that children "recover thematic roles inherent in the described action" (Pinker 1984 p. 297). The other extreme holds that a child "assumes a thematic role only if it can be related to an appropriate phrase" (Borer & Wexler, 1987 p. 135). Both of these extremes lead to problems. The middle course charted in this paper holds that the two-year-old child assumes that one participant, the figure or patient, is related to an action predicate. The child does not assume that causers in the context are destined to become thematic roles. The child assumes that the intentionality of the figure or patient will be important, and pays attention to inflections and auxiliaries that imply the intention to act. When the child is faced with an inanimate figure or patient in the context, simultaneously with the morphological expression of intention, the child deduces that an agent is relevant to the predicate, even if the agent NP is missing from the sentence. Thus, the child may go beyond explicit NPs.

This account leads to developmental predictions for the acquisition of Japanese. First, young Japanese children should not use intransitive action verbs in the causal-agentive context, nor transitive verbs in the self-agentive context. Second, the acquisition of morphemes that imply intention will proceed more rapidly than the acquisition of the case markers, because of their importance in expressing semantic causal types. Third, since the number and type of arguments a verb takes are related to semantic causal types, then errors in producing the correct number and type of arguments should be fewer than errors in the production of case marking.

As a first check on the plausibility of these predictions the action sentences of two Japanese children were examined, T and H. Each of the children were observed for a three month period: T (28-30 mo.)and H (22-24 mo.). One hour of tape recorded interaction with caregivers was transcribed per month for both boys. The child sentences were coded in the same manner as adult sentences.

T produced 13 verbs five times or more (Table 3). All of T's transitive verbs were matched to the causal-agentive type. All of T's intransitive verbs appeared in the either the self-agentive or non-agentive context. As predicted, there was no use of an intransitive verb in the causal-agentive context. T never produced an intransitive verb with a causer NP. The number and type of arguments were entirely appropriate. As can be seen from Table 1, T was very adult-like in the rarity of case marking. In contrast, 36% (80) of T's sentences had inflections that imply intentional action. The acquisition of morphemes that imply intention proceeded more rapidly than the acquisition of case marking. In fact, twice T unconventionally produced the

nominative case marker on figure NPs of transitive sentences.

There is also evidence of semantic grouping among H's frequently used action verbs (Table 3). None of the intransitive verbs appeared in the causal-agentive context, and none of the transitive verbs appeared in the self-agentive context. H produced neither nominative nor accusative case marking (Table 1). In contrast, H produced 10 inflections that imply intention. All of these inflections were found on transitive verbs. H never produced an intransitive verb with a causer NP. The number and type of arguments produced were always appropriate.

The course of development followed by H and T is consonant with this account. First, these children used intransitive action verbs in the self-agentive context or the non-agentive context, but not in the causal-agentive context. They used transitive verbs in the causal-agentive context, but not in the self-agentive context. Second, the acquisition of inflections and auxiliaries that imply intention proceeded more rapidly than the acquisition of the case marking. Third, they did not produce explicit causers with intransitive verbs, so that the number and type of arguments which a verb took were always appropriate. In contrast there were two case marking errors in the older child's sample. Such errors have also been reported by Clancy (1986), but to my knowledge errors in the number and type of arguments have never been reported. Taken individually, none of these observations provide strong support for the present hypothesis. However, taken together, in conjunction with the facts of Japanese input, this account of the acquisition of action verb subcategorization seems quite plausible.

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Table 1

Frequency of Explicit Causer, Figure or Patient NPs and Case Marking in the Action Sentences of Japanese Caregivers and Two Chidren

	Caregivers		Children			
Sentence Type			H (22-24 mo.)		T (28-30 mo.)	
Intransitive Sentences	Freq.	%	Freq	%	Freq	%
- figure / patient NP	97	.63	91	.92	77	.71
+ figure / patient NP						
- *ga*	50	.32	8	.08	27	.25
+ *ga*	8	.05	0	.00	4	.04
Total	155	1.00	99	1.00	108	1.00
Transitive Sentences	Freq.	%	Freq.	%	Freq.	%
- causer, - figure / patient NP	44	.30	32	.56	44	.38
+ causer NP only						
- *ga*	19	.13	20	.35	6	.05
+ *ga*	6	.04	0	.00	1	.01
+ figure / patient NP only						
- *o*	48	.33	3	.05	51	.44
+ *o*	9	.06	0	.00	4	.03
+ causer, + figure / patient NPs						
- *ga*, - *o*	15	.10	2	.04	6	.05
+ *ga*, - *o*	3	.02	0	.00	4	.03
+ *o*, - *ga*	1	.01	0	.00	0	.00
+ *ga*, + *o*	0	.00	0	.00	1	.01
Total	145	1.00	57	1.00	117	1.00

Note: *ga* = nominative case marker, *o* = accusative case marker

Figure 1

Expected Contexts for Semantic Causal Types

Morphology	Figure or Patient Animacy: Animate	Inanimate
Intentional	Self-Agentive	Causal Agentive
Non-intentional	Non-Agentive	Non-Agentive

Figure 2

Observed Contexts of *hair-* "go in" (intransitive) *suwar-* "sit" (intransitive), and *ire-* "put in" (transitive) in Caregiver Sentences

Morphology	Figure or Patient Animacy: Animate	Inanimate
Intentional Examples:	*suwar-* (intransitive) *suwar-i-tai* "Want to sit" (desiderative)	*ire-* (transitive) *ire-te* "Put in" (request)
Non-intentional Examples:	*suwar-* (intransitive) *suwat-ta* "Sat"	*ire-* (transitive) *ire-ta* "Has put in"
Examples:	*hair-* (intransitive) *hair-u* "Will go in"	*hair-* (intransitive) *hait-te iru* "Is in"

Table 2

Observed Contexts of Verbs
Used Five Times or More By Caregivers

Verb Type	Observed Contexts		
Transitive Verbs	Causal-Agentive	Self-Agentive	Non-Agentive
tor-"take"	y	0	0
age- "give"	y	0	y
ire- "put in"	y	0	y
kake-"hang"	y	0	y
tabe-"eat"	y	0	y
nom-"drink"	y	0	y
mot-"hold"	y	0	y
Intransitive Verbs			
iki-"go"	0	y	y
kaer-"come back"	0	y	y
ne-"go to sleep"	0	y	y
suwar-"sit"	0	y	y
hair-"go in"	0	0	y
hashir-"run"	0	0	y
koware-"break"	0	0	y
shin-"die"	0	0	y
tore-"come off"	0	0	y
tsuk-"stick to"	0	0	y

Table 3

Observed Contexts of Verbs Used Five Times or More
By Children H and T

Child H's Verbs

Verb Type	Observed Contexts		
Transitive Verbs	Causal Agentive	Self-Agentive	Non-Agentive
nom-"drink"	y	0	y
tsukur-"make"	y	0	y
kak-"write"	0	0	y
mot-"hold"	0	0	y
Intransitive Verbs			
de-"go out"	0	0	y
hair-"go in"	0	0	y
ik-"go"	0	0	y
koware-"break"	0	0	y
mawar-"turn"	0	0	y
tomar-"stop"	0	0	y
tat-"stand"	0	0	y

Child T's Verbs

Verb Type	Observed Contexts		
Transitive Verbs	Causal-Agentive	Self-Agentive	Non-Agentive
hasr-"spread"	y	0	y
ire-"put in"	y	0	y
kak-"write"	y	0	y
mot-"hold"	y	0	y
tabe-"eat"	y	0	y
tor-"take"	y	0	y
tsuke-"put on"	y	0	y
Intransitive Verbs			
ik-"go"	0	y	y
kaer-"come back"	0	y	y
ne-"go to sleep"	0	y	y
nor-"ride"	0	y	y
hair-"go in"	0	0	y
tomar-"stop"	0	0	y

Note: y = appeared in context at least once. 0 = did not appear in context

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